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MOTION PICTURES IN THE TRAINING PROGRAMS OF THE UNITED STATES NAVY

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MOTION PICTURES IN THE TRAINING PROGRAMS
OF THE UNITED STATES NAVY

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By

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CHAPTER I

THE PROBLEM AND ITS SCOPE

The Problem

The main purpose of this study was to determine the
present status of motion pictures in educational and train-
ing programs, particularly, but not entirely, with respect
to the United States Navy. This involved research in the
following fields: 1. a history of the motion picture indus-
try; 2. a resume of the Navy's administrative and production
procedures with motion pictures in World War II; 3. a review
of the available literature as to the influence of motion
pictures in training programs; 4. a review of the latest
and most thorough of all studies that are presently being
conducted by Pennsylvania State College in this field; 5. an
estimate of the future possibilities of motion pictures through
the medium of television. As to this last area, it should
be noted that complete agreement with Hoban exists concern-
ing the differences between television and motion pictures:[1]

> Television...is capable of transmitting, with
> the extraordinary facility of radio, all the sym-
> bols and most of the techniques employed in motion
> pictures. Theoretical distinctions between motion
> pictures and television are, therefore, limited to
> considerations of technical transmission and sched-
> uling, and audience density, structure, and viewing

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1. C. F. Hoban Jr., "Some Aspects of Learning From Films,"
   p. 20. Incidental Report No. 2, Pennsylvania State
   College, Instructional Film Research Program, June 21,
   1949.

habits and conditions. In the communication media
(symbols) employed, television and film are theo-
retically identical.

Need for the Study

In his eleven years experience in the Navy the author
has had the privilege of administering two large training
programs that involved considerable use of motion pictures.
During these periods and subsequent to them he has been asked
by Naval officer contemporaries innumerable questions which
indicated the average Naval officer's insufficient knowledge
of the field of training with motion pictures. This study
is an attempt to summarize research studies as well as pos-
sible, in referenced form, so that answers to many elementary
questions are answered and so that further study may be made
by reference to the cited works.

Delimitations

The problem was limited to the more theoretical aspects
of training with motion pictures. For example, no attempt
was made to consider the mechanical aspects, such as thread-
ing motion picture projectors, trouble-shooting with "fouled"
transmission devices, or laying out the motion picture class-
room. For such problems as these the reader is referred to
an excellent brief text covering these and similar such
problems by Dent.[1] This study is meant to provide the Naval

1. E. C. Dent, The Audio Visual Handbook. Chicago: Society
   for Visual Education, Inc., 1949.

officer a quick reference on motion pictures for training programs.

Definitions

Braun tube--a cathode ray tube in which a stream of electrons, controlled in intensity by the incoming signals, is caused to sweep over a fluorescent screen by a varying magnetic field.

Cathode ray tube--a discharge tube used for projecting cathode rays. Cathode rays are projected from the cathode of the tube in which the electric discharge takes place. They consist of electrons, moving in straight lines unless deflected by the action of a magnetic or electric field, and differ from the beta rays only in having smaller velocities. By impinging on solids the cathode rays generate X rays.

Dissolves--motion picture sequences in which the old scene is absorbed by the new one by appearing on the outer edges of the screen, the old scene assuming the shape of a circle in the center the diameter of which becomes smaller and smaller until it completely disappears from its pin-point self in the center of the screen.

Dynamic--pertaining to changes, changes in process, or involving or producing alterations.

Emulsion--a suspension of sensitive silver salt, especially silver bromide, in a viscous medium, usually a gelatin solution, used for coating plates, films, etc.; also, the coating when dried.

Fade-in--the gradual appearance of the screen image from total darkness to its full visibility.

Fade-out--the gradual disappearance of the screen image from its full brilliance to total darkness.

Iconoscope--a registered trade mark applied to a class of electron-gun pick up or camera tubes employing the storage principle in their operation and utilizing an electron scanning beam to convert photoemission effects into video signals.

Image dissector--a type of television camera tube developed by Farnsworth.

Kinesthetic response--that type of response that gives sensory experience to the senses whose end organs lie in the muscles, tendons and joints of the human body.

Kinetoscope--a trade mark applied to a machine for producing motion pictures.

Montage--the movie process of producing several images that revolve around each other or that rush one after the other to a sharp focus in the foreground, as newspaper head-lines. Also--the production of a rapid succession of images to illustrate an association of ideas.

Mutoscope--a simple form of animated-picture viewing device in which the series of views is printed on paper and mounted around the periphery or a wheel.

Orthicon--a registered trade mark applied to a pick up or camera tube, representing a refinement upon the

Iconoscope, in which the storage electrode is scanned by low-impact-velocity electrons.

Panchromatic film--film sensitive to all colors.

Phi-phenomenon--the apparent motion of lines, pictures, or other objects which are shown in rapid succession of different positions, without any actual motion being presented to the eye. Movies depend on this illusion.

Stereopticon--a highly developed form of the magic lantern, using chiefly photographic pictures and an intense light, and often made double so as to produce dissolving views.

Wipes--motion picture sequences in which the new scene pushes away the old one by appearing in the center of the screen, gradually becoming larger and larger until it replaces the scene before.

BRIEF HISTORY OF THE MOTION PICTURE INDUSTRY

Early History

Motion pictures are of recent origin. The first motion
picture projector made its appearance in 1895 and came as a
result of three previous inventions; one was photography,
another the magic lantern and the third an optical toy which
gave an appearance of movement to a rapid showing of several
static pictures.[1] Several optical toys of the type referred
to here have been in vogue at various times since their in-
ception. One type, still rather well known, involves a num-
ber of pictures in a bound book each printed on a page of
its own in a slightly different phase of some continuous ac-
tion. The flexible book's bound edge is held in one hand and
the book is bent back by the thumb of the other and, with
the thumb slowly withdrawing, the leaves fly past the eye
in rapid succession giving the illusion of a moving picture.
A variety of this form of toy known as the Mutoscope may
still be found in use at seaside piers and amusement arcades.

These devices of still motion pictures creating the
illusion of motion are due to a characteristic of the eye
known as persistence of vision and psychologically referred

1. Ernest Lindgren, The Art of the Film, p. 19. New York:
    The Macmillan Co., 1948.

to as the phi-phenomenon.[1] For one tenth of a second after the sudden disappearance of something that has been viewed by the eye it will still continue to be "seen" although the object has escaped from the field of view of the eye.[2] This persistence of vision can be easily demonstrated by merely placing an electric light bulb inside a closed box. A small aperture is cut through one side of the box and a disc with two of its opposite quarter segments cut out is fixed to the near side of the box so that when it is turned the segments remaining pass over the aperture in the box. When the speed of the revolving disc is kept low the light within the box will flicker on and off; however, when the disc is speeded up so that the aperture is uncovered twelve, sixteen or more times per second the light will appear continuously; the moments in between are bridged by the persistence of the light image on the retina of the eye.

Much the same type of visualization appears with the optical toy. It is essential that each picture visualized be stationary, or approximately so, at the moment that it is visualized, and, further, that as the picture is moved from the field of vision, the observer's view be momentarily blocked. If instead of having momentary blocks of vision the eyes were allowed also to see the pictures as they slid

1. N. L. Munn, Psychology, p. 323. Boston: Houghton Mifflin Company, 1946.

2. Loc. cit.

into and out of the field of vision, the observer would view
one continuous blur. When, however, a series of stationary
pictures are presented, the persistence of vision bridges
the gaps and the illusion of movement persists.

The first of the optical toys of known reference was
produced in the year 1834.[1] The second essential of modern
motion pictures, the photograph, followed a few years later,
1839.[2] After this event it was but a short time till invent-
ors were attempting to discover an apparatus that would take
photographs in rapid succession so that later they could
be merged again like in the optical toy in order that viewers
would receive the impression of life-like movement. Glass
was first experimented with, as a photographic support, but
of course had to be discarded as being too clumsy.[3] The
English inventor, Friese-Greene, in 1887 patented a rapid
action camera for use with perforated strips of paper or other
suitable material[4]—he had been experimenting with oiled
paper. Finally the solution was discovered by the use of
a thin ribbon of transparent celluloid coated with photographic
emulsion. The first apparatus to employ the celluloid film

1. Lindgren, op. cit., p. 21.

2. Loc. cit.

3. Loc. cit.

4. Loc. cit.

was the Edison Kinetoscope, which was patented in 1889.[1]
From the Kinetoscope Auguste and Louis Lumiere developed the
idea of the projector which they first used to show motion
pictures publicly on December 28, 1895.[2] This completed
the cycle needed to make the motion picture complete. It
should be noted that there exists very little difference be-
tween the film of Edison's Kinetoscope and films used today--
the only significant difference being the addition of the
sound track. In 1903 the first attempt at a fictional story
was made in a film entitled, The Great Train Robbery, pro-
duced by Edison.[3]

Sound Motion Pictures

Edison experimented with talking pictures, but the per-
fection of this idea had to await the development of a com-
pletely new industry--radio. Edison did make phonograph
recordings to use with his pictures, but it was radio that
brought amplifiers strong enough to allow a throng of theatre
patrons to hear properly.[4] Edison experimented with adding
sound to motion pictures as early as 1886; Leon Gaumont of

1. Loc. cit.

2. Ibid., p. 22.

3. Ray Hoadley, How They Make a Motion Picture. Thomas Y.
   Crowell Co., New York: 1939.

4. Homer Croy, How Motion Pictures Are Made, pp. 295-307.
   Harper & Brothers Publishers, New York: 1918.

France made contributions in 1910; Elias Reis of New York, however, finally adapted to film the sound track which is the actual forerunner of present day sound tracks.[1] "The sound picture of the present day was initiated in 1926 by Don Juan, produced by Warner Brothers, and having a musical score synchronized on disks. The following year, the same company released The Jazz Singer with spoken dialogue."[2] Some interesting observations published by an author in the year 1918 on the future possibilities of sound in motion pictures follow:

> The reason why spoken drama, interpreted in action by motion pictures, will never be a success is an interesting one.
> The chief source of interest in motion pictures is the constant stimulation they are the means of furnishing to the brain by the fact that part of the story is left out. The mind is stimulated into interpreting the action of the performers on the screen and applying their motives and anticipating their actions more by the fact that the words are missing than if the words were audible. The observer supplies his own words, in his own language, and after his own manner of thought, as art in its highest form always causes an observer to do. The message it conveys to an American and to a Chinaman is antipodally different, as would be the message of a great painting, and each, conceiving his own interpretation, is satisfied with the part he has taken in the play. With the words unspoken, the observer enters into the play and imagines himself a participator more than if some omniscient machine supplied them. Without the words he is free; he interprets the actions as befits his age, experience, and philosophy. With words his imagination is handicapped

1. Loc. cit.

2. Encyclopedia Brittanica, Vol. 15, p. 857. Encyclopedia Brittanica Incorporated, Chicago: 1949.

rather than stimulated. Dramaturgically, the coming
years will not find talking-pictures a success.
With their presentation in their new and advanced
form they will be greeted as a novelty and live
the life of a novelty.[1]

Colored Motion Pictures

Colored motion pictures are even today making strides
toward improvement that began with Frederick E. Ives in 1889.
Ives threw objects in color on a screen in stereopticon form
and thus antedated the first motion picture by five years.[2]
W. Friese-Greene of England experimented with the use of a
three colored glass projecting all its colors on each frame
of film as it was exposed.[3] Lee and Turner's experiments
brought about panchromatic film.[4] George Smith and Charles
Urban of England, through a color process they called Kine-
macolor, made use of the colors red and green; this method
was used to process colored motion pictures of the Corona-
tion of the Durbar in India.[5] In 1912 Gaumont of France
projected the first motion picture in three colors.[6] The
American Museum of Natural History in New York was the scene

1. Croy, op. cit., pp. 359-60.

2. Ibid., p. 284.

3. Ibid., pp. 285-9.

4. Loc. cit.

5. Loc. cit.

6. Loc. cit.

of a four-color process named Prizma shown in 1917.[1] Today
we are using emulsion processes that act as both the positive
and negative film and consist of three colored layers of
emulsion. Research is still continuing for the perfect color
film. Color has reached a high state of development, but
it has not replaced the black and white film.[2]

Motion pictures have progressed, indeed, until their
position in both the commercial and military world is unques-
tioned. "In 1937 there were 89,097 motion picture theatres
in the world. Approximately five-hundred and fifty feature
pictures were produced in the United States and were exhib-
ited to eighty-eight million weekly attendance paying over
$1,000,000,000 for the year in admissions at an average ticket
cost of 22 3/4 cents."[3] It can further be noted that in
the same year the United States produced forty per-cent of
the world's total motion picture product representing seventy-
five per-cent of the total value of that product.[4] In three
and a half years of World War II, eleven hundred Navy train-
ing pictures, averaging two reels each, were produced.[5]

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1. Loc. cit.

2. Encyclopedia Brittanica, Vol. 15, p. 857. Encyclopedia
   Brittanica Incorporated, Chicago: 1949.

3. Loc. cit.

4. Ibid., p. 858.

5. Orville Goldner, "The Story of Navy Training Films,"
   Business Screen, Vol. 6 (June, 1945), p. 29.

In one of these years alone total release prints purchased
by the Navy approximated thirty-two thousand miles--this
amount could encircle the globe 1 1/3 times and keep a single
projector running twenty-four hours a day every day of the
year for approximately 8½ years.[1]

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1. L. R. Goldfarb, "Film Procurement," Business Screen,
     Vol. 6 (June, 1945), p. 84.

CHAPTER III

THE MOTION PICTURE PROGRAM IN THE NAVY IN WORLD WAR II

Overview

Most of the Navy's photographic needs during World War
II were taken care of by the Photographic Division of the
Bureau of Aeronautics. It should be pointed out that the
photographic effort of this Bureau was not confined to its
own needs--a considerable portion of its product was devoted
to the other Bureaus of the Navy. Originally photography with-
in the Navy was most concerned with aerial reconnaissance and,
therefore, when the problem of assigning someone the role of
developing various techniques in photography arose in the
earliest phases of World War II it was only natural that it
should be assigned to the Bureau most experienced with photo-
graphy.

During World War II over one thousand civilian and mil-
itary personnel were responsible to the Training Film and
Motion Picture Branch in the Photographic Division of the
Bureau of Aeronautics.[1] In the Photographic Science Labor-
atory Branch of this Division were additional hundreds of
people who produced high priority and highly classified train-
ing films. The Division also had technicians working in the
Hollywood and New York facilities. Coast Guard and Marine

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1. Goldner, op. cit., p. 29.

Corps personnel also worked under its cognizance. The Training Film and Motion Picture Branch set the policies and patterns for Naval training film no matter where work was done through its sub-sections of Project Supervision, Procurement, Cataloging and Distribution.[1]

Project Supervision

The largest section of the four was Project Supervision, which was responsible for the research, planning, initiation and follow through on all training film projects. It was concerned largely with production. It supervised photography in the cramped quarters of submarines, in blimps, in the noisy turrets of our battleships and in myriads of aircraft sequences. A project supervisor was usually assigned to each picture from its embryo stages to its finish. He prepared the production outline. With the technical advisor he directed the indoctrination of the script writer in the intricacies of the particular subject. He then got necessary approval of the final script. Next security releases were secured for the crew, and work was begun on "location". He passed on the "rushes" and the editing and gave final approval before the film was officially accepted by the Navy.[2]

1. Loc. cit.

2. R. E. Furman, "What Is a Project Supervisor?" Business Screen, Vol. 6 (June, 1945), p. 63.

Procurement

The responsibility for the expenditure of funds that
made the purchase of the tremendous number of motion pictures
possible lay with the Procurement Section of the Navy's Train-
ing Film and Motion Picture Branch. Its functions were sep-
arated into three broad categories:

> I To negotiate and initiate contracts with
> commercial producers for the production of Navy
> training films and other motion pictures;
> II To negotiate and initiate contracts with
> commercial film laboratories for the processing
> and printing of training films and other motion
> pictures; and
> III To purchase other miscellaneous materials
> necessary to implement the Navy's training film
> and motion picture program.[1]

With military motion pictures as the final product it is under-
standable that the contracts made between the Navy and the
producers were of considerable importance. The contracts had
to be sufficiently flexible in order to protect producers
against the contingencies of film production, yet sufficiently
rigid in order to insure the Navy a dollar's worth of pictures
for a dollar's worth of contract. Weather that, in some
cases, held up production 50% of the time was costly. Also
expensive were changes made in combat techniques half way
through the filming of a picture. Oftentimes after a complete
production crew had traveled hundreds of miles in order to
secure appropriate pictures of a certain vessel, the ship

1. L. R. Goldfarb, "Film Procurement," Business Screen,
Vol. 6 (June 1945), p. 36.

would be operationally committed to other tasks before the
production crew arrived. Since the Bureau of Aeronautics had
contrary views toward "cost plus" contracts it is easy to
realize how contracts were a big problem in the procurement
program. After about two years of various contractual pro-
cedures, that were of varying degrees of success, procedures
were evolved that proved themselves practical and satisfac-
tory; a step by step analysis of these procedures follows.

After the master script for the training picture had
been written and approved, the first step was to solicit
price proposals from the many available producers. It was
not possible nor practical to solicit proposals from all
producers so such items as producer's proximity to the "shoot-
ing" locale, experience and skill in the particular type pro-
duction desired, background as a high or low cost producer,
and efficiency in delivering the completed film on schedule
were all given consideration.[1] When the producers to be so-
licited were decided upon, the Project Supervisor visited the
producers for purposes of a conference to iron out any details
and questions that existed in the producers' minds about the
script that was submitted each of them on which to base their
estimates. The producers, having all the details accurately
fixed in their minds, submitted to the Navy their proposals
with a cost breakdown of each. The cost breakdown not only

1. Loc. cit.

allowed the Navy a survey of the reasonableness of the price of the proposal, but it also gave the producer a logical and orderly method in which to make accurate estimates that would well be done before production commenced. These specifications themselves were placed in the contract so as to protect the producer in case changes later resulted due to reasons beyond his control. These specifications once were not included in the contracts, but later were found indispensable for the protection of all parties concerned.[1]

After all proposals had been scrutinized and weighed according to their individual merits the producer was chosen. The next step was to get approval of the producer's proposal from all interested Navy parties; the request to the Contracting Officer of the Bureau of Aeronautics to award a contract to the producer selected followed.

After the contract had been awarded and the producer commenced production, the Navy may have seen fit to make various changes to the script. These changes varied from sundry small items to major changes involving changes in locale, length of production, etc. The changes in cost involved because of changes in production were usually approved by the production supervisor when below a certain level, and by the Bureau when of greater magnitude. In cases where the cost involved did not reach the price estimated in the

1. Loc. cit.

contract, the contract price was redetermined and reduced accordingly. The procedures discussed here were the major responsibility and function of the Procurement Section. Other procedures related to these should be mentioned; they were such duties as approving invoices for payment, maintaining adequate supplies of raw film stock, allocating raw film stock to producers, preparing the annual budget of the Training Film and Motion Picture Branch, liaison with other Army and Navy activities, maintaining numerous records, and reviewing procurement procedures for continued effectiveness.[1]

Cataloging

The Cataloging Section of the Navy's Training Film and Motion Picture Branch had two main functions:

    I. To accumulate and to maintain records on:
        A. Films produced by the Navy,
        B. Films from other sources having potential
            use in the Naval Establishment, and
    II. To disseminate film information throughout the
        Naval Establishment:
        A. During production of each film, and
        B. After its completion.[2]

Actually the Cataloging Section was concerned with all stages of the life of a Naval Training Film. The Section's first function was to assign a number to a proposed film, by which number the film would be known in the Navy during its entire existence. As the film passed from Project

1. Goldfarb, op. cit., p. 84.

2. J. H. McLelland, "Check With Cataloging," Business
   Screen, Vol. 6 (June 1945), p. 32.

Supervision to Procurement and to Cataloging for various phases of initiative the Cataloging Section entered the picture several times in order to accumulate proper information for later dissemination. Production outlines, action outlines, story boards, scripts, correspondence and reports of all kinds represented the source materials from which Cataloging received its fund of information. This fund of information was used later to perform the second major function of Cataloging--that of disseminating information. A weekly Film Log was maintained and as each of the several hundred films currently in production reached any one of several production mileposts that fact was recorded therein. This process was found expedient for two reasons: first, to keep production-supervisors informed of what was going on in their own and related fields; second, it was frequently found possible to correlate production activities on two seemingly uncorrelated subjects in order to save time and expense.[1]

The film catalog, kept up to date by means of cumulative monthly supplements, was issued every four months listing all the films available to the Naval Establishment. The information pertaining to every film included:[2]

    I. Navy serial number.

    II. Title.

    III. Security classification.

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1. Loc. cit.

2. McClelland, op. cit., p. 33.

IV. Running time.

V. Date of release.

VI. Whether the prints were in color or black and
white.

VII. Whether the film was silent or sound.

VIII. Description of film content.

The Cataloging Section also, through checking other
film sources such as the Army, commercial concerns, and the
Allied Nations, was often able to secure films much more
quickly and economically than it would have been possible to
produce such films to fill the same need.

Distribution

During the war some 40,000 prints of training films
were distributed to Navy personnel monthly.[1] The function
of distribution actually began before the Navy produced the
picture through consideration of questions that had to be
answered during the early stages of production. The questions
to be answered were: 1. Who comprised the intended audience?
2. What would the size of the audience be? 3. How many
prints were needed? 4. Where would the prints be sent?

The supplying of the prints was also the responsibility
of the Bureau of Aeronautics. The Requesting Authority, which
requested production of the film, also forwarded a request

1. Ernest Martin, "Distribution's Double Duty," Business
   Screen, Vol. 6, (June 1945), p. 38.

for distribution of required prints along with the request
for production. Aviation film distribution needs were pre-
pared and submitted by the Distribution Unit in the office
of the Chief of Naval Operations. Distribution needs for all
other type films, the largest of the two categories by vol-
ume, were either prepared or screened by the Bureau of Naval
Personnel before being presented to the Bureau of Aeronautics.

Upon receipt of the distribution lists by the Distri-
bution Section of the Training Film and Motion Picture Branch
the lists were coordinated. The Section also determined print
orders and placed them with film laboratories according to
priorities. Shipping was made from one of the established
centers in Washington, New York and Hollywood. From these
three points films were distributed to selected schools,
training centers or ships, or to film libraries. Officers
in charge of the film libraries were given the responsibility
of distributing films within their area or district.

Training Film Libraries were established in each Naval
District, at important Naval Air Stations, and at strategic
locations overseas. The Bureau of Naval Personnel, the Chief
of Naval Operations, the Commandant, Marine Corps and the
Commandant, Coast Guard had cognizance over existing train-
ing film libraries and each provided training films as needed.

The initial distribution phase was but a small part
of the overall distribution program. A larger volume was
handled by reprints in order to satisfy the growing needs

of the Navy. Other agencies were combed for their possible
contributions and of 7,000 subjects being distributed at one
time during the War only about one-half were produced by the
Navy itself.[1]

During World War II approximately 1,300,000 prints were
supplied to the entire Naval Establishment, most of which
were 16 millimeter sound motion pictures in black and white.[2]
Colored films approximated 10% of the distributions.[3] In
the earlier phases of the war when most of the intended audi-
ence was in the training centers, most training films were
distributed to shore stations; however, during the last year
of the war approximately 75% of the training films were uti-
lized by the forces afloat and advanced bases, whereas only
25% were provided for the shore establishments.[4]

Production Techniques

The Navy's techniques of production that allowed for
the correct and proper amount of training were basically sim-
ilar to those techniques utilized by other agencies. An
analogy of the techniques and effects utilized by artists in
painting a mural might introduce this problem best.

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1. Loc. cit.
2. Loc. cit.
3. Ibid., p. 39.
4. Loc. cit.

To accomplish the painting of a mural of the epic Battle of Midway, five different artists would very likely use five different techniques as well as five different sets of equipment to arrive at their desired result. Each end product would probably fully accomplish portraying appropriately the Battle; however, as patrons of art should pass by each masterpiece, there very likely would occur a different effect in the minds of each of the passers-by. Of one mural various comments would probably be heard such as, "That, I like"-- "It's certainly well done"--"How revolting"--"I don't like that," etc., but it can be rather certainly assumed that one of the murals would mean more and mean it more effectively than would the other four.

Despite the fact that, given the same specifications, research data, tools, equipment, and material for the development of a theme in a mural, the end results can be different because of two factors--the quality of the craftsmanship expressed in the use of tools, equipment, and materials, and the appropriateness of the imagination applied to the interpretation of research data which we assume to be the truth."[1] The training film, like the mural, is the result of basic factors that lead naturally to the development of their own method of presentation. Goldner says:

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1. Orville Goldner, "The Training Film Formula," Business Screen, Vol. 6, (June 1945), p. 55.

A qualitative analysis of any training film reveals the following ingredients in the order of their application in the training film production process:

(1) The truth about a condition or set of conditions.

(2) Interpretation of the truth as it relates to human behavior.

(3) Visualization of the interpretation of the truth in a way that will permit individual identification with it.

(4) Verbalization of the interpretation of the truth in terms and in a manner that will permit the relatively effortless development of definite behavioral concepts.

(5) Emphases, both visual and audible, which emanate naturally out of the interpretation of the truth (2,3,4 above), and which will add to the immediate and retention value of the whole.[1]

An amplification of the five ingredients necessary in the training film production process presented above is necessary in order that they be properly understood.

(1) The Truth About a Condition or Set of Conditions. This is the first step that must be considered in the production of a training film. The truth will not be known until all the available sources of available data have been searched for the facts. Searching out the truth includes:

(a) Research in books, manuals and reports.

(b) Visits to those localities where the subjects to be photographed and presented exist--this, in amplification of and/or in opposition to what has been learned from reading material.

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1. Loc. cit.

(c) The conducting of interviews with persons intimately familiar with the operation of the subject equipment.

(d) The review of other motion pictures or audio-visual material already produced in the same or allied fields.[1]

The research indicated above requires the best efforts of those persons who are especially qualified in such methods. They must be persons not satisfied with a mere perusal of the "surface material" and who have the ability to search out primary sources so that only the naked truth is utilized in the presentation of the problem. This process was especially difficult in the Navy's production of training films in the late War since its films dealt primarily with the operation of weapons of warfare--these weapons include such varied items as machine guns, battleships, aircraft, tactics and mechanized personnel. Methods of operation changed necessarily from day to day as the situation developed and, consequently, research had to be continuously conducted even while the production of a particular training film was being expedited. At times, where the changes in methods were too dynamic, production was necessarily "frozen" until the proper methods stabilized themselves.[2] This first ingredient

1. Loc. cit.

2. Ibid., p. 56.

required primarily an acute mind and a knowledge of research
techniques.[1]

(2) <u>Interpretation of the Truth as It Relates to Human
Behavior</u>. This step, by its title, implies that a given
audience will experience human behavior in a different fashion
at different age levels. It depends upon such items as en-
vironment, experience, education and the heritage of those
individuals that make up the audience.[2] The content of the
film having been based on the original research (step 1)
was delimited in scope in order to apply to its defined au-
dience. A thorough knowledge of the objective of the film
plus the curriculum it would fit into, if a curriculum ex-
isted, were necessary in order to establish the needs of the
audience. In those cases where it was determined that the
film was not intended to fit into a given curriculum--that
is, was to "stand on its own feet"--a different interpreta-
tion of the truth had to exist. That is, the subject matter
was made more general, with an introduction and a review or
summary added. A knowledge of the construction of training
films was considered essential in this second step.[3]

(3) <u>Visualization of the Interpretation of the Truth</u>.
This third step required a "picture mindedness."[4] It required

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1. <u>Loc. cit.</u>

2. <u>Loc. cit.</u>

3. <u>Loc. cit.</u>

4. <u>Loc. cit.</u>

a complete visualization of the final production with its
various sequences in such a way that they could be properly
verbalized in a script. The script had to show all the re-
lated "truths" in such a way that a cameraman, or anyone later
associated with the production of the film, could transpose
the verbalization to the pictured whole and arrive at the
originally desired goal.

Visualization may utilize any technique necessary in
order to achieve its desired result. In many cases this
involves the use of drawings where the subject matter demands
it, such as in the fields of surgery, celestial navigation
and weather. Regardless of the method used it must contrib-
ute in such a way to the production process that the individual
learner will identify himself with the motion picture no mat-
ter what he sees.[1] "For he must 'feel' the visual experience
as a mental-emotional entity. There must be an experiential
bond, a kinesthetic response to the actions pictured. Vi-
cariously he must get as close to actual experience in a
specific area as is possible."[2] Then, if he does, adequate
and effective learning will take place. It requires that the
process will allow all the technicians necessary in such a
production to get in moving pictures what is necessary in
order that the proper and desired effect is realized.

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1. Loc. cit.

2. Loc. cit.

Cameramen, animators, carpenters, scene painters, laboratory technicians, actors, directors and many others are all a part of this function. Visualization is the most important of the five steps necessary in the training film production process.

(4) <u>Verbalization</u> <u>of</u> <u>the</u> <u>Interpretation</u> <u>of</u> <u>the</u> <u>Truth</u>. Verbalization merely involves the use of words with the motion picture. Since words are easily used and easily changed their use is to be especially scrutinized so that they always give proper identity and that they not be used if a picture can give the same or better result. Three conditions are important in the use of words in training films, according to Goldner:

> (1) The vocabulary must be "geared" to the audience. The words used must not be "over their heads," or have a "talk-down" effect.
> (2) Words should be used only where absolutely necessary to an understanding of the picture. Words should not be used for themselves alone.
> (3) Voices and voice quality used for narration and dialogue must give the impression of understanding the subject matter. They must be "voices of experience" talking personally <u>to</u>, and not impersonally <u>at</u> the audience. There must be no "selling" but rather sincere and straightforward "informing."[1]

The words must fit the pictures and both should fit the audience so that definite behavioral concepts can take place in an effortless manner. The important feature of this step to be emphasized is that writers must be "seeing" writers, in that they realize that in the motion picture media it is

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1. <u>Loc</u>. <u>cit</u>.

more important to visualize than to verbalize. Using this technique, motion pictures will become pregnant with meanings.

(5) Emphases--Visual and Audible. This, the fifth step in the proper formula for the training film production process, is the most difficult to explain because it involves all of the various techniques peculiar to the motion picture process. These techniques or devices include the whole of optical effects and screen devices, music, sound effects and many others. The important point is that they must be naturally accepted as a part of the film and add to the truth as it was originally conceived to exist. Humor, music, wipes, dissolves, fade-ins and -outs, double exposures and montages are all valuable screen devices, but they must contribute naturally to the subject matter in such a way that they increase the learning process and add to the retention of the subject matter. This step requires the best efforts of all the technicians associated with the production of the training film. It requires, in the final analysis, a high degree of skill so that only those techniques that contribute to the learning process are synthesized properly and in a logical and effective manner.

CHAPTER IV

THE INFLUENCE OF MOTION PICTURES

Background

The question of the influence of motion pictures, es-
pecially on the learning processes, has existed since the
conception of motion pictures. Many of the earlier studies
dealt with their influence on children and, therefore, it
is easily understood why The Committee on Educational Re-
search through the Payne Fund made studies covering the period
up to 1933 as to this influence in its relation to the growth
and development of the child.

The committee came to the conclusion that the motion
picture, as such, was a very formidable means of learning
for children; they based their findings on a comparative
study of the learning of adults and children.[1] A movie was
selected in which a group of "superior" adults (college pro-
fessors, graduate students and their wives) saw, as determined
by a test given subsequent to the presentation of the movie,
a little less than nine-tenths of what had been previously
determined as factual information presented. Children of
various ages also viewed the film and it was determined that:

    I. The eight or nine year old child saw and remembered
        half of what he saw;

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1. W. W. Charters, Motion Pictures and Youth. New York:
    The MacMillan Co., 1935.

II. the eleven or twelve year old saw and remembered
     two-thirds;

III. the fifteen or sixteen year old saw and remembered
     four-fifths;

IV. second and third grade children, six weeks after
     having attended the motion picture, remembered 90%
     of what they recalled in I. above;

V.   three months later, the eight or nine year olds
     recalled as much as they did six weeks after having
     attended the movie.[1]

In summary of the above, Charters states:

> Hence roughly speaking a parent who is a su-
> perior adult can count upon his young child to see
> approximately three out of the five things he sees,
> his eleven or twelve year old child to see three
> out of four, and his fifteen or sixteen year old
> to catch nine out of ten. Or putting the conclusion
> in another way the eight or nine year old sees half
> of what is to be seen, the eleven or twelve year
> old two-thirds, and the fifteen or sixteen year old
> four-fifths of what is to be seen...At all ages
> including the adults the slow drop of the curve of
> forgetting is striking.[2]

Hoban, in 1937, saw even greater possibilities of motion

pictures than others in the field at that time:

> Yet, in the motion picture there is a medium of
> instruction which has uses and values far beyond
> the possibilities now realized. It is not improb-
> able that the future will see the motion picture
> used not only as a teaching tool supplementary to

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1. Loc. cit.

2. Ibid., pp. 8-9.

textbooks, but also as a primary mode of experience
out of which other educational activities arise.[1]

In situations where the same learning must take place
among the less learned as well as among the more scholarly,
the motion picture is an instrument of merit. In one situa-
tion where photoplays were used to teach a large cross sec-
tion of children, Dent states This contribution was of such
magnitude that average children with the aid of photoplays
learned as much as bright children did without them.'[2] He
also records that recruits in the armed forces learn better
and faster with the use of the motion picture.[3]

Various advantages that accrue through the use of motion
pictures were recorded by Hoban who used a study by the Amer-
ican Council on Education of twenty-five hundred educational
films based on fifty-six hundred teacher and two thousand
student judgments:

I. Motion pictures add continuity of action.

II. They eliminate irrelevant detail.

III. They provide the best possible view of the pheno-
mena at the user's convenience.

IV. They can express time accurately, but still compress
or expand the actual process involved.

1. C. F. Hoban Jr., The Motion Picture in Education Its
Status and Its Needs, Series II, Vol. I, No. 1, Washington,
D.C.: American Council on Education, April, 1937.

2. E. C. Dent, The Audio Visual Handbook, p. 24. Chicago,
Illinois: Society for Visual Education, Inc., 1949.

3. Ibid., p. 4.

V. They can, through animation processes, provide sequences otherwise unobservable to the student.[1]

He further concluded in the same study that motion pictures developed rational control of emotions, critical thinking, and student-initiated activities and attitudes.[2]

At the conclusion of World War II, Hoban was able to summarize research findings relative to the use of films, in which he indicated: the ability of motion pictures to stand on their own feet in dynamic education, that motion pictures should adapt themselves to present day curricular trends and allow for student expression, their effect on student activities especially as they evolve within the local community, their development of habits of inquiry within the students, and the proper development of attitudes and values.[3] As a result of his experience with wartime films, Hoban further concluded that motion pictures can:

    I. teach the proper concepts of social attitudes and ethics on a mass basis;

    II. encourage individual initiative;

    III. heighten interest in the curricula;

    IV. teach better various skills than other procedures can;

1. C. F. Hoban, Jr., Focus on Learning, p. 25. Washington, D. C.: American Council on Education, 1942.

2. Ibid., pp. 80-102.

3. C. F. Hoban Jr., Movies That Teach. New York: Dryden Press, 1946.

V.   develop team-work better among the learners;

VI. present material psychologically rather than "pseudo-psychologically;"

VII. give assistance in the development of control of the emotions.[1]

The areas in which motion pictures had such a complimentary effect were earlier conducted by Freeman in social studies, penmanship, physics, home economics, English, and health education;[2] by Goodman in safety education;[3] by Acnspiger in music;[4] by Rulon in general science;[5] by Hausen in biology;[6] and by Consitt, Knowlton and Wise in history.[7,8,9] Clark and Rulon described their beneficial effect

1. Loc. cit.

2. F. N. Freeman, Visual Education. Chicago: University of Chicago Press, 1924.

3. David Goodman, "The Comparative Effectiveness of Pictorial Teaching Materials," Educational Screen, Vol. 2, pp. 358-59, 1942.

4. V. C. Acnspiger, Measuring the Effectiveness of Sound Pictures as Teaching Aids. Teachers College Contributions to Education, No. 505, 1933.

5. P. J. Rulon, The Sound Motion Picture in Science Teaching. Harvard Studies in Education, Vol. 20, 1933.

6. J. E. Hausen, "The Effect of Educational Motion Pictures Upon the Retention of Informational Learning," Journal of Experimental Education, Vol. 2, pp. 1-4, 1933.

7. Frances Consitt, The Value of Films in History Teaching. London: Bell & Sons, 1931.

8. D. C. Knowlton and J. W. Tilton, Motion Pictures in History Teaching. New Haven: Yale University Press, 1929.

9. H. A. Wise, Motion Pictures as an Aid in Teaching American History. New Haven: Yale University Press, 1939.

in the development of critical thinking;[1,2] Consitt depicted their ability to develop an understanding of the background of characters and events in history;[3] Eichel explained their ability to allow retention of imagery concepts for a long period of time;[4] Aonspiger, Freeman and Wise all developed the concept of their ability to increase the fund of information;[5,6,7] Hausen, Knowlton, Tilton and Goodman described their ability to allow for longer retention of information than when other materials were used;[8,9,10] their ability to stimulate interest had been developed by Westfall, Wittich and Freeman;[11,12,13] their knack of developing voluntary

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1. C. C. Clark, "Sound Motion Pictures as an Aid in Class-
    room Teaching," Unpublished Doctoral Dissertation. New
    York University, 1932.

2. Rulon, op. cit.   3. Consitt, op. cit.

4. C. G. Eichel, "An Experiment to Determine the Most Ef-
    fective Method of Teaching Current History," Journal of
    Experimental Education, Vol. 9, pp. 37-40, 1940.

5. Aonspiger, op. cit.   6. Freeman, op. cit.

7. Wise, op. cit.   8. Hausen, op. cit.

9. Knowlton and Tilton, op. cit.

10. Goodman, op. cit.

11. L. H. Westfall, A Study of Verbal Accompaniments to Edu-
    cational Motion Pictures. Teachers College Contributions
    to Education, No. 617, 1934.

12. W. A. Wittich, Audio-Visual Paths to Learning. New York:
    Harper, 1946.

13. Freeman, op. cit.

reading was recorded by Consitt, Hoban, Knowlton and Tilton; [1,2,3] their ability to modify social attitudes was related by Dale, Peterson and Thurstone; [4,5] and their ability to increase proper and purposive social responses were brought to light by Bell, Knowlton, Tilton and the Tower School Staff. [6,7,8]

Selection of Films

After the instructor has decided upon the type of behavior he desires to develop in his students he must be careful to choose the proper film in order that he may reasonably expect that behavior to develop. [9] All films are not alike

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1. Consitt, op. cit.

2. C. F. Hoban Jr., Focus on Learning. Washington, D. C.: American Council on Education, 1942.

3. Knowlton and Tilton, op. cit.

4. Edgar Dale, Audio-Visual Methods in Teaching. New York: Dryden Press, 1946.

5. R. C. Peterson and L. L. Thurstone, Motion Pictures and the Social Attitudes of Children. New York: MacMillan, 1933.

6. Reginald Bell, et al., Motion Pictures in the Modern Curriculum. Washington, D. C.: American Council on Education, 1941.

7. Knowlton and Tilton, op. cit.

8. Tower School Staff, The School Uses Motion Pictures. Washington, D. C.: American Council on Education, 1940.

9. Wittich, op. cit.

in their methods of development of the subject matter and
instructors must realize the capabilities of their students
so that students are led from their present field of know-
ledge to the area in which the instructors desire to lead
them. Vocabulary is important in this field.

Each film that is selected by the instructor for pre-
sentation should be carefully viewed so that it is considered
to "fit" with the past experience of the students and so
that it will tend to "pave the way" for students in their
future learning. The film having been selected should next
be previewed so that it may be determined that it implements
the developed training formula. Students must be guided through
their past references to the subject matter at hand in the
film so that the material to be presented will be meaningful.
This does not mean merely a period spent in recall questions.
It means a development of judgments and evaluations, of at-
titudes and a distinct correlation with the everyday living
habits and surroundings of the students.[1]

The showing of motion pictures in the training process
are not to be considered terminal experiences, but rather the
development of interests that will further motivate the trainee
to learn more.[2]

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1. C. F. Hoban Jr., _Movies That Teach_. New York: Dryden
    Press, 1946.

2. Wittich, _op. cit._

Certain factors that should be considered by all those involved in the selection of films for a training program, or even by those considering the production of a film, follow and are primarily based on the research of the American Council on Education. Hoban emphasizes a number of points to be properly considered.[1]

I. Maturity of the student. The younger student is concerned more with the detail of what he sees; the older student is more interested in the interpretations he makes of what he sees. The older student becomes more critical of the acting and photography.

II. Interest is greatest when the characters portrayed are nearest in status to the students.

III. Characters portrayed of the same sex are preferred. Males prefer males and vice-versa. If characters of both sexes are portrayed those in the audience will prefer the activities of those of their own sex.

IV. Students will react more readily to unfamiliar persons in familiar settings or to familiar persons in unfamiliar settings.

V. "Pacing" of the film to suit the audience is necessary; that is, the film should not be too difficult for the audience to follow nor too simple so that their interests stray. Hoban found that the

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1. C. F. Hoban Jr., Focus On Learning. Washington, D. C.: American Council on Education, 1942.

application of certain principles aided this factor: they were:[1]

A. The scenes must be of the proper length--long enough so that the audience is able to absorb what is to be seen.

B. Scenes should be deliberately repeated in the film where the action involves intricate or complicated procedures, or where involved emotional portrayals are made.

C. Those scenes that involve a major element of importance in the learning process for a given procedure should be followed by a psychological pause--a period in which what has been shown may be absorbed. This is based on the theory of retroactive inhibition. The retroactive inhibition theory simply means the inhibition by present activity of memory of previous activity. It is one psychological theory of forgetting. Scenes previously shown will tend to be forgotten if the presentation of materials is too rapid. This offers an explanation of why some training films, because of their rapid presentation of the factual data, sometimes tend to confuse students.

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1. Ibid., pp. 94-95.

D. A depth and variety of meaning must be given to
the subject matter through the use of repetition or varied presentation of the same material.
It is not simple repetition that is important
here, but rather repetition in a variety of
meaningful ways that adds to the knowledge of
the learner. "Learning is like bathing--a bath
is best where there is time for soaking, lathering and splashing around in the water--not just
an in and out dip in the tub or in the shower.[1]

E. The commentary must be such that it meets the
audience at the level that the audience wants.
The language must be such that the audience
does not feel it is being talked down to; it
must not be bookish; it should be such that it
arouses interest and arouses the curiosity of
the learner. It is not meant that the language
be in dialect or that slang be employed.

In motion pictures people are not just interested in
ships, but ships maneuvering at sea; not in sailors, but in
sailors performing their tasks of endeavor; not just in aircraft, but in aircraft going through their maneuvers.[2]

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1. W. J. Iverson, "A Definition of Teaching Competencies
with Audio-Visual Materials," p. 25. Unpublished
Doctoral Dissertation, Stanford University, Stanford,
California, 1948.

2. Hoban, op. cit., p. 145.

A film has good organization when its story is woven around the lives of people. It includes all techniques such as close-ups, cartoons, maps and diagrams that cannot be photographed in action.[1]

Hoban added other measures that should be applied to training films:[2]

I. Retention is effected by the method of presentation. The force and vividness of portrayal lends itself to better retention than merely the importance of the subject portrayed.

II. Commentary to films must be adequate, natural and clear. The audience will resent being "sold a bill of goods."

III. Action should be portrayed in preference to talk about action. Audiences would rather see the action take place than be told about it.

IV. Special effects, such as wipes, dissolves, fast-motion and slow-motion must not be too complicated to be understood.

V. "Stock shots" are to be avoided. Students are annoyed when they see the same "shot" repeatedly used in various films, although such usage leads to economies.

1. Loc. cit.

2. C. F. Hoban Jr., Movies That Teach, pp. 87-106. New York: Dryden Press, 1946.

VI. "Over-selling" should be avoided. More mature students, in particular, dislike being made the tools of obvious and clumsy propaganda.

VII. The use of slapstick is to be questioned. Although many audiences clamor for the use of humorous cartoons they often laugh off the learning. Dialogue or film commentary, if too humorous, may also nullify some of the learning that could otherwise take place.

VIII. Theatrical techniques, although sometimes adding to the entertainment value, must be used with discretion so that they do not detract from the learning.

IX. Good teaching films follow a basic structure.

A. The introductory sequences should be on a ground familiar to the students. They serve to allow the student to identify himself with the film and draw out his interest so that his motivation may reach a maximum. They serve to establish a _rapport_ with the student.

B. A detailed presentation is given using demonstrations, dramatizations and explanations that are suited to the capabilities and background of the audience. It presents the skills necessary to meet the situation.

C. After the main presentation of the film the points to be emphasized are summarized, thus

providing an intellectual summing up for the
student of the film.

D. The film then motivates the learner, in the
final analysis, in such a way that he desires
to continue learning so that he may perform
operations he saw in the film.[1]

An Evaluation of Motion Pictures in Dynamic Learning

In order to properly evaluate motion pictures as an aid
to learning, an experiment was conducted by the Army Air
Forces in which three different groups of aviation cadets were
taught position firing through the use of a film, a manual,
and a lecture.[2] A fourth group was added, for control pur-
poses, with no training so that their score on tests could
be used as a base line for the scores of the other three
groups. The four groups were selected at random from a total
of 430 aviation cadets, which number was reduced to 456 after
eliminating those with previous knowledge of the subject;
thus each group contained from 100 to 130 men. The film had
been produced through the best efforts of the instructors,
writers of training literature, and professional film pro-
ducers. It was of 15 minute duration, animated, presented

1. C. F. Hoban Jr., Focus on Learning, p. 103. Washington,
    D. C.: American Council on Education, 1942.

2. J. J. Gibson, Motion Picture Testing and Research.
    Washington, D. C.: U.S. Government Printing Office,
    1947.

with commentary in logical order and contained a minor plot
with humor. The manual was pocket size, fifty pages in length,
employed latest visual methods with excellent colored dia-
grams, had a minimum of text and was studied by the groups
without discussion or explanation. The half-hour lecture was
given and organized around nineteen lantern slides, having
been written, rewritten and memorized for the actual lecture
period. It was not pedantic, it employed good face-to-face
teaching, had a question period, and as given in its final
form was considered by two college teachers to be excellent
instruction. All three methods utilized the best techniques
possible and covered the same fourteen basic points of subject
matter previously agreed upon. The tests given after each of
the groups had been exposed to a method of learning were based
around the basic fourteen points of instruction. Some ques-
tions were pictorial rather than verbal, of the objective
five-choice type, overlapping in them was omitted, and re-
editing eliminated misleads. From the great number of orig-
inally selected questions twenty-five were finally agreed upon
to be given that would cover the basic points. The questions'
mean level of difficulty immediately after testing was about
seventy percent and about fifty-five percent when tested
two months later.

The results of the test indicated that the film was
superior in amount learned immediately, it was superior in
amount remembered after two months, it was superior immediately

after training for the lowest and highest thirty percent of
each group in intelligence, it was superior for the same
thirty percent lowest and highest in intelligence two months
after training. It might be interesting to note that the
manual was second best in the tests immediately after train-
ing and the lecture was second best in the tests given two
months after training. The statistics were proved significant
as for differences between motion pictures and the other meth-
ods, but they were not significant in differences between the
lecture and the manual. The manual and the lecture were re-
checked as to content and it was decided that they were equiv-
alent and in some cases better than the motion picture film.
It was concluded that the reasons for superiority of the film
method were because of its ability to, first, better teach
"dynamic" learning--learning dealing with variation and rela-
tions of one item with another; second, it is better to teach
with movies the subjects that deal with use or human action
meanings since they are difficult to describe in words or
static diagrams. The motion picture was better able to do
in fifteen minutes than what the lecture was able to do in
a half hour. From the military standpoint of mass training
a conclusion of importance is drawn in the study that "the
effect of good motion picture instruction on the learning
of certain kinds of specified achievements is to reduce the
variability of the achievement among the trainees and to put
them more nearly on an even footing."[1]

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1. Loc. cit.

CHAPTER V

A REVIEW OF THE FILM RESEARCH PROJECT
AT PENNSYLVANIA STATE COLLEGE

Background

Probably the most exhaustive and thorough study that
has ever been made in the field of application of motion
pictures to a training program is the Instructional Film
Research Program being conducted at Pennsylvania State Col-
lege, subsidized by the United States Navy and under the
direction of Dr. C. R. Carpenter. The nature and purposes
of these studies have been simplified by Finstad.[1]

1. Studies which deal specifically with audio
and visual perception, such as the effect and
the most appropriate use of color and music in
film presentations.
2. Studies which seek the effects on learning
of idea density, length of films, and concen-
trated use of films.
3. Studies which examine the effectiveness of
training films that incorporate such teaching
principles and techniques as questioning, lear-
ner participation, and other forms of motiva-
tion which, if successful, would allow the film
to assume a greater proportion of the complete
teaching job.
4. Studies which involve actual production of
model films, utilizing and exemplifying dis-
covered principles, and testing the teaching
power of these films.
5. Mechanical scoring and performance testing
devices, essential to statistical handling
and which may have possible byproduct value
in future utilization of films.

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1. Allan Finstad, 'The Navy Looks Forward in Audio-Visual
Education, U.S. Naval Training Bulletin, (November,
1948), pp. 22-23.

The Instructional Film Research Program, at this writing, is still being conducted at Pennsylvania State College and the final conclusions have not been drawn from it. However, the director, Dr. C. R. Carpenter, drew up a general summary of the trends of the results in June, 1949--a synopsis of this summary follows.[1]

Introduction

Up to June 1949 two years had been devoted to the research. Fifteen-thousand subjects had taken part in the experiments, thousands of man hours had been spent and large sums of money had been invested. The purposes of the program had constantly kept in mind--the conducting of research from which facts would be obtained that would point the way toward proper production and utilization of motion pictures so that large numbers of personnel could be trained in a minimum amount of time.

After these two years of research, the directors of the Program felt that vigorous scientific research based on the systematic theories of learning, perception, and attitude formation would give the proper skeletal framework for the research. This was decided upon in lieu of such other researches that had utilized panels of experts, audience "likes and dislikes," "principles of art appreciation," and analyses

1. C. R. Carpenter, 'General Summary of Trends of Results: The Instructional Film Research Program 1947-1949,' Progress Report No. 11-12. Pennsylvania State College-- School of Education, June 30, 1949.

of specific factors that prevailed in existing instructional films.

The task was divided into two parts: (1) Application of the laws of learning to the dynamic medium of the motion picture. The endeavor in this field was to determine *exactly* how these laws applied to the dynamic medium of the motion picture; then upon their exact determination it would be possible to reorganize these principles to the motion picture. (2) The application of the new laws to the radio, films and television. It seemed altogether probable that upon the completion of the task new laws of learning might develop.

Trends of Research Results in Film Production Procedures

    I. Pre-production testing.

        A. The objectives of the film should be explicitly determined prior to the task of script writing.

        B. Both instructor specialists (educational or psychological advisors) and subject-matter specialists (technical advisors) are to be consulted in order that proper content and presentation follow.

        C. Pre-production testing should be done. It should measure the degree to which the film will accomplish the desired objectives, as originally decided upon or as later modified. These tests can be made, as appropriate, to the script, the

story-board, or film-strips with accompanying commentary. The tests should be given to sample populations that are as nearly similar to the trainee population as possible. Before being released the film should be tested and evaluated objectively in terms of its _actual instructional performance standards_. The results of these tests should be released to the instructors who will utilize the films in their curricula, and their limitations and performance levels should be stated.

II. Film production and audience characteristics.

    A. It is a foregone conclusion that the exact capabilities of the ultimate trainee audience should be supplied to the technical and educational advisors as well as to the writers, directors and editors who form part of the film production process. Such characteristics of the trainees as the following should be known:

        1. Intelligence level.

        2. Previous knowledge and training in the substance of the film.

        3. The existing patterns of general or specific interests.

        4. The probable degree of motivation by the trainee audience.

5. The probable need for the information contained in the film.

6. The degree of verbal comprehension.

7. The level of comprehension of technical aspects of the film.

B. The limited range of the film objectives has become more and more evident. In other words, films that are slanted toward an audience with general abilities and general subject matter interest will be less effective than those designated for a specific audience with specific objectives.

C. The pacing of the film should be appropriate. The more familiar training films are primarily of a dramatic or entertaining nature. Training films for a military audience must take into consideration the present abilities and background of the students and must be varied accordingly. The level of difficulty of the subject matter itself will affect the pacing of the film.

D. The showing of errors in a training film is still under debate; however, it is felt that probable errors that might occur in actual performance should be slowly and deliberately shown in the film.

E. The camera angle used in filming has been dis-
covered to be unequivocally important. In show-
ing performance skills the camera should assume
the same position in relation to the task being
performed as the trainee will take in perform-
ing the task.

F. Too many times the present day instructional
film serves only as a background to the commen-
tary. All too often the film and commentary
are not closely enough integrated in order that
the full impact of the film can be realized.
Factors in this area which have been investi-
gated by the Program are:

1. Level of verbalization. Too many as well
   as too few words can be used in the commen-
   tary. With due regard to the audience and
   the subject matter, tests should be given
   for each film to determine the optimum level
   for the amount and kind of verbalization.
   Regard must be given to the degree of com-
   prehension of the audience as well as the
   difficulty of the vocabulary.

2. Phase relations. Much interest has been
   shown in this field in which it is being
   determined whether the commentary should
   precede, follow, or coincide with the visual

cues in the film. With some films, "lead-
ing" with the commentary is found desirable,
whereas with others "lagging" of the com-
mentary is to be desired.

3. Form of address. In studies to determine
whether the use of the first person, second
person, third person, or imperative forms
should be used in the commentary, it has
been determined that, for military person-
nel, the use of the imperative form is to be
favored. The least favorable results were
obtained through the use of the third per-
son passive.

G. The usage of color versus black and white films
has been investigated and research is still
continuing in this area. Results to date have
shown no significant advantage in the use of
color, except in those cases where color was
important as a cue to the learning process.

H. Films accompanied with "matched music" and films
with no musical accompaniment have been studied
and no significant differences exist in the
amount of learning that takes place. Research
in this field is continuing.

Trends of Research Results in Film Utilization Procedures

I. One of the basic considerations of the entire Film
Research Program has been the investigation of

whether or not instructional films may be used ex-
clusively in a training program--that is, without
the aid of other instruction. In order to give
maximum support to the cause of motion pictures
it was originally determined to produce several
pictures that would be slanted with this thought
in mind. However, excessive time and expenses that
would be involved precluded this procedure. Instead
several pictures already in existence with subject
matter in the general scientific field were used,
and the results indicated that films could be used
as an exclusive means of instruction.

> The trends of results confirm this hypo-
> thesis. Furthermore, it is believed that
> if an integrated series of films were de-
> signed according to presently known prin-
> ciples and produced for teaching specific
> subject matter to audiences or classes of
> known characteristics, the series could
> do a highly effective instructional job in
> a shorter than average period of time.
> This could be achieved without the presence
> of well-trained instructors and without
> having actual equipment present in class-
> rooms.[1]

This is a confirmation of the Air Force Experiment
recorded by Gibson,[2] of Hoban's early dreams,[3] and
is of particular significance to the military services

1. Carpenter, op. cit., p. 8.

2. Supra, p. 44.

3. Supra, p. 32.

which, in times of emergency, are usually confronted
with the training of countless numbers, with inad-
equate instructors, and under conditions that put
a premium on time.

II. The results tabulated concerning massed versus dis-
tributed learning with films indicate that films
can be made three or four times longer than the
average Navy training films now in existence (about
seventeen minutes in length) with no loss in the
amount of learning. Therefore, it is probable that
films of the future can easily run into one-hour's
length per training period.

III. Introductions and summaries of training films that
are "built in" the films themselves have brought the
conclusion that, if planned and utilized properly,
no further introductions or summaries are necessary.

IV. Learner participation experiments were conducted
where the learners themselves repeated answers to
questions in the films, and where they followed
action as it occurred in the film. "Audience parti-
cipation," as it is now conceived in this field
did not add to or increase the learning of the train-
ees in these experiments.

> Thus it would seem that the speed of
> development or rate of presentation of the
> films must be slowed down for complex knots,
> or other tasks, so that all members of the
> audience may actually tie the knots without

becoming frustrated, inhibited and confused. Frustrated attempts retard (inhibit) learning. The present trend of thought still includes the hypothesis that practicing a response facilitates learning, but it is required to know specifically what the best conditions are for practice, what acts need to be practiced (both overtly and symbolically), and what degree of practice is required for maximum learning effectiveness. Furthermore, it is believed that procedures used to secure participation must not interfere with the organization of the material to be learned, nor distract from the essential facts to be learned, nor create adverse sets or attitudes on the parts of trainees.[1]

V. Repetitive showings are usually disliked by both the instructors and the students; however, the research indicates that two or three showings of the same film increase the amount of learning. Training films are usually packed with factual items that are presented at a very rapid pace, so that retroactive inhibition and a missing of the various points of importance must be guarded against. Thought should be given to splicing together two prints of the same film and presenting them at one "sitting."

VI. Study guides that can be used by the students at times other than when viewing the training films, and which cover in review form films already seen, have been shown to be a great aid to the students.

1. Carpenter, op. cit., p. 10.

New methods of presenting study guide materials
are being investigated.

VII.   Requirements for full effectiveness at each stage
of the training film process must be maintained
throughout. Each link must be strong, from the
conceiving of the film objectives to the point of
presentation of the film to the students. A per-
fect film that is ruined at the time of presentation
by such items as poor seating arrangements, inade-
quately controlled lighting, poor ventilation, bad
acoustics, faulty projection, etc., can reduce
greatly the amount of learning. At all times op-
timum conditions should exist in order to obtain
the best results possible.

CHAPTER VI

TELEVISION

Background

Hungerford relates that in 1929, while a freshman at the Massachusetts Institute of Technology, he, with his contemporaries, spent hours attempting to "tune-in" television images from a nearby television station that appeared, reddish in hue, on his three inch screen.[1] Television, at that time, and for many years later, appeared to be "just around the corner," but perfections had to take place before it became a reality. Dr. Zworykin of RCA invented the iconoscope, and Dr. Farnsworth the image dissector; these were followed by the cathode ray tube, patterned after the Braun tube earlier produced in Europe.[2]

In 1936, all the above were gathered into a system to make possible the projection of electronic pictures through the air. On July 7, 1936 the first live-talent electronic television broadcast in the United States took place.[3]

Before World War II the National Broadcasting Company was conducting a full fledged schedule of television programs.

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1. E. A. Hungerford, Jr., "The Use of Television in Education," p. 1, A Report, Special Devices Center, Port Washington, L.I., N.Y. Aug. 5, 1949.

2. Loc. cit.

3. Loc. cit.

For educational programs, such renditions as "The Explorers' Club," and "Thrills and Chills with Doug Allen" were produced.[1] Biology was taught, and the Metropolitan Museum of Art employed the facilities of television for its programs. Chemistry was taught in one instance to an actual class at New York University.[2] Just prior to the United States' entry into the war, instruction was given Air Raid Wardens in the performance of such duties as Air Raid Instruction, First Aid, and De-contamination.[3]

The Navy, through its Office of Naval Research, has subsequent to the war become vitally interested in the medium of television for the development of its instruction programs--this interest has spread to other branches of the Armed Forces.

> In the Navy we call it instruction, but instruction and training or education are not far removed. To instruct is to show someone how to do a task. To educate him is to also show the theory behind your instruction. In wartime, the services have little time for the latter unless it contributes to the speed and effectiveness of instruction to a marked degree.[4]

Hungerford states that the Armed Forces have definite reasons for being interested in television for their instruction programs; these are:[5]

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1. Ibid., p. 5.

2. Ibid., p. 6.

3. Loc. cit.

4. Ibid., p. 8.

5. Ibid., pp. 8-10.

I. The services are interested in speed of training and, therefore, seek a medium such as television which has a great impact upon the learners. Television is up to date, alive, and gives an immediacy to the training well received by the students.

II. The television medium is flexible. If only a few are viewing the television screen, or if there are thousands viewing screens, no second print is needed --the one program can be confined locally or viewed by a widely scattered populace.

III. Television gives standardization. The same 'word" is received by all the students. In the handling of life and death mechanisms, standardization of instruction is of vital importance.

IV. The effectiveness of one able instructor is multiplied many times by the use of television. There are insufficient top-grade instructors. In the military forces where good instructors are retained to train new instructors, and where the best of the new are also retained to provide instructor training, it leaves only the lowest caliber instructors doing the actual instructing of students.

Disadvantages of television, as cited by Hungerford are:[1]

I. Television cannot act alone--it must act as an adjunct to other methods of teaching. Instructors

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1. _Ibid._, pp. 10-13.

to "follow up" on television programs and aid in the motivation of students toward further learning are considered necessary.

II. The distribution system for television as now devised does not allow for proper security of classified subjects. Coaxial cables and secure microwave links would circumvent these disadvantages, however.

III. Instruction by television in its initial stages is expensive. The expense of original plant investment later, of course, becomes infinitesimally small providing the training audience is large enough.

IV. The television instructor must be of outstanding caliber--his sole audience is the camera lens. He must be able to recognize the more complicated portions of his lecture and take time to explain them in great detail. This point has been taken into consideration by the Navy in its recent projects so that the instructor has been able to check up on his audience reaction, and the system allows for audience participation which, in itself, has proven educational benefits. In those cases where the instruction is reaching more than ten classrooms, a voice circuit is introduced which allows for communication between the instructor and the

students. For example, after having labored over
a particularly difficult point the instructor may
want to know how his point was received so he simply
might address a question to seat seven in Boston,
there being a seat seven in every classroom. Or
he merely may address a question to the audience
in New York or Washington. When the classrooms
number in the hundreds, little dial buttons are on
each student's desk allowing him four choices in a
multiple choice quiz and the students "dial in"
the answer they feel most suitable. The instructor
then reads a simple device in his studio that quickly
indicates to him the percentage of correct answers.
This allows the instructor to deviate from his pre-
pared script as necessary in order to assure proper
assimilation of a given point.

V. Since television is a live medium, unlike the movies
that can be retaken, mistakes appear in various
form during the performance. Students, however,
realize this feature and this disadvantage actually
gives television an impact of its own so that they
are drawn closer to the instructor since they real-
ize "to err is human."

VI. The expert instructor at the television studio must
depend upon local instructors for follow-up and
further motivation of the students. This is

obviated, too, to an extent by having the studio lecturer discuss his lecture informally with local instructors over the circuit prior to the presentation of the instructional program.

Navy Experiments in Television

The Special Devices Center, a field activity of the Office of Naval Research, has been conducting experiments on the use of television at Port Washington, Long Island, New York.

> The studio is a well equipped facility. In a sound and airconditioned room 40 feet by 50 feet by 18 feet high are two image-orthicon live camera chains mounted on a moving picture type dolly. There are adequate quantities of lights, microphones, and miscellaneous equipment. A film chain is also available, arranged such that either motion pictures (16mm) or one or two slide projectors can operate into the iconoscope film camera using a setup of mirrors. The projectors can be loop dissolved, one to the other or to the live cameras, through a very flexible control console. Two portable image-orthicon camera chains are also provided for operating remotely from the studio. These same cameras are also used in the studio when three or four cameras are needed. They are then connected through the master console for complete flexibility. For point to point relaying we also have constructed a UHF link transmitter for video and have adapted a low powered FM transmitter for sound transmission.[1]

During the first six months of 1949, Naval Ordnance and Gunnery were taught to the Kings Point Merchant Marine Academy about five miles distant. Forty telecasts were run in all, with twelve used for controlled evaluation. In eight

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1. _Ibid._, p. 14.

of these twelve controlled lectures, five were on radar and
three on battery alignment. The instructor taught two,
twenty man sections via television and three face to face.
The same instructor was used in each instance in order to
eliminate instructor differential. In the other four lec-
tures, on CIC and sonar, the best instructors in television
available were used in that medium, while in the face to
face lectures the run of the mill training instructors norm-
ally found at a training station were used. Visual-aids in
the television broadcasts were kept to a minimum. Dr. Robert
T. Rock of Fordham University evaluated the experiments.[1]

> We came out even all in all. At the present
state of our advancement, we could teach as well
over the system and get as much across as could the
same instructor working with a class head on, and
using all the same props which he had designed for
television. I always thought that this was some-
what unfair to us, since no local instructor could
have the props we used for operation on a grand
scale, because only one set for the television stu-
dio could be afforded. This is one of our advan-
tages. So maybe we did pretty well to come out even.
I hasten to add my own opinion, which has many
backers, that at present we exploit the television
medium about 40% of what we could do. So the hand-
writing on the wall is clear. We will excel face
to face teaching and simultaneously we will teach
all alike per se. We have a future.[2]

In substantiation of Hungerford's remarks a consultant

to the Human Resources Research Laboratories who sat as

1. D. D. Reynolds, "Training by Television," pp. 5-6, A
Report, Special Devices Center, Port Washington, L.I.,
N.Y. September, 1949.

2. Hungerford, op. cit., p. 18.

an observer during some of the evaluations had this to
say:

> While these findings will probably be favor-
> able, they cannot give a full picture of televi-
> sion's usefulness in training. The construction
> of the tests, the conditions under which they were
> administered, and the nature of the programs, them-
> selves, make this unlikely. The general indica-
> tions are that television can probably make a much
> greater contribution to training than this study
> will show.[1]

Later in 1949 a series of lectures was beamed via tele-
vision to Naval Reserve groups at three Naval Air Stations:
Floyd Bennett near New York City; Willow Grove near Phila-
delphia; and Anacostia near Washington, D. C. Some were for
officer students and others for enlisted students. A break-
down of the curriculum appeared as follows:[2]

Officer Pilots	Enlisted Airmen
Civil air regulations.	Theory of flight.
Aerology; air masses and fronts, including cyclonic depressions.	Line safety, aircraft landing, and pre-flight.
Aerology; weather map anal- ysis, including frontal weather, thunderstorms, etc.	Plane captain duties; serv- icing radar and interphone; cleaning instruments.

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1. S. F. Harby, "Report on the Television Project Conducted
   by the Navy At Its Special Devices Center, Port Washington,
   N.Y. (June 30 to Sept. 18, 1949)," p. 15, A Report,
   Audio-Visual Research Division, Human Resources Research
   Laboratories.

2. Reynolds, op. cit., p. 8.

Navigation; flight problems, including use of computers.	Ordnance and aerial gunnery.
Radio aids to navigation including an introduction to ground control approach.	Weights and balances.
Use of oxygen at high altitudes.	Survival and safety.
Engineering; pre-flight check, weights and balances, yellow sheet.	Basic jet engines.
Planning the flight under marginal weather conditions; cross country flight under visual flight rules, and instrument flight rules; instrument landing system; ground control approach landing.	Basic nuclear physics.

As concerns the difference in techniques employed in instructing officers as compared to enlisted personnel in the above curriculum, some interesting observations were made by Harby.[1]

> In my own opinion, the programs for enlisted men were much more effective than for the officer group. The fact that the enlisted men had little previous training influenced the program makers to build simple, practical lesson plans, with heavy dependence on demonstrations, models, films, and other visual aids well-suited for televising. The officer's programs were more theoretical and depended more upon language. We mention this here only as an example of how the character of the audience will influence the programs to be televised. As for the audience density, structure, viewing habits, and conditions, these matters are easily determined by directive in a military organization.

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1. Harby, op. cit., p. 5.

Some Production Problems and Techniques in Television

When instructional programs are to be used on a national scale, where a difference in time zones would bring about differentials in the time of day in which various audiences would view the program, the problem of audience motivation is involved. It has been pointed out that the very first morning classes are "slow," that classes before lunch are "flighty"--thinking of lunch, that classes immediately after lunch are "drowsy" and apathetic.[1] Some thought should be given to proper curriculum timing throughout the day in instances such as these for maximum utilization of television schedules.

Some opinions have been expressed that, like movies, television programs are so vitally packed with factual information that it is difficult for the student to assimilate all of a lengthy training production. It has been suggested that mental "rest periods" be introduced--equivalent to the period when the class looks out the window--during which mental relaxation is allowed without losing the thread of the entire program. It has been further suggested that "ten minutes is the maximum for one subject, and three minutes the maximum for one technical point. Then a break and a fresh start."[2]

A question has arisen as to whether or not classes should be separated on the basis of high or low I.Q.'s. An answer

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1. Reynolds, op. cit., p. 15.

2. Ibid., p. 15.

to this problem has been suggested in that the purpose of
the program should first be ascertained. If the aim is to
impart a maximum amount of information in the shortest amount
of time then division by I.Q.'s is reasonable. If the pro-
gram were, however, to serve as a selective function where
the more able were to be selected for further training and
the less efficient weeded out, then no such division would
be useful.[1]

Problems of finding the right instructor have appeared
--the problems of the instructor himself have been discussed
previously;[2] however, it should be noted that when the Spe-
cial Devices Center, after having designated certain elemen-
tary criteria for their desired instructor, used IBM proce-
dures to select them from available Naval officers, only one
was found to fill the billet. It must be remembered that
highly capable officers or highly capable technicians do
not guarantee highly capable television instructors. Pro-
fessional actors have been used by the armed forces in war-
time movies--in some cases this policy has points in its
favor. "A professional actor used in the Kings Point series,
however, brought comments from the class that he didn't
sound as if he knew what he was talking about."[3]

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1. Loc. cit.

2. Supra, pp. 61-2.

3. Reynolds, op. cit., p. 17.

The amount of props and visual-aids to be utilized in a television program cause concern especially when large props, such as cut-away model jet-engines, are desired to be utilized. Rather than going through the exorbitant expense and time involved in bringing the model to the television studio, it is suggested that short movie sequences be made of the model and the instructor, to be projected via television when necessary, so that the expense and time involved in moving the prop be eliminated.

Television in Civilian Education

Civilian educators are frequently thought of as being slow to adopt new methods. Who, however, would advocate using untried methods before putting them to general use in our educational institutions? It is thought, however, that with the possibilities of television being as great as they are, educators should not imperil their positions by not taking part in its development. Some of the things that educators might do in this particular field have been suggested by Lewis as being:[1]

I. Programs should be planned in cooperation with local television producers. At present, much scheduling time is still available, and since stations are "public service" minded, educators could schedule

1. Philip Lewis, "The Future of Television in Education," The Phi Delta Kappan, Vol. 30, (Dec., 1948), pp. 157-8.

local programs of educational interest especially during school hours.

II. Setting up "on the job" training programs with local producers to train key personnel who could "carry the word" to others.

III. Develop program techniques that avoid an amateurish presentation which cause resentment in the viewers.

IV. Conduct experiments to determine in which fields the medium of television is best suited.

V. Set up controlled experiments to discover the retentivity of subjects taught via television.

VI. Determine the effects of such causative factors as eye fatigue, viewing angles with direct view vs. projection receivers, contrast and brilliancy, and attention spans of various age groups.

VII. Advocate and support the establishment of a national commission on the educational aspects of television, the objectives of this group to be aimed at setting up standards, specifications and goals for school use, and to distribute information to the profession concerning the sociological, psychological, technical, managerial, and artistic characteristics of the medium.

VIII. Display such interest in the use of television for educational purposes to influence the Federal Communications Commission to set aside certain channels

exclusively for education purposes. This should be
done before regular commercial agencies secure all
the available channels for strictly entertainment
purposes.

IX. Assemble and publish all the material in this field
periodically in order to keep the profession informed.

Lewis cites the following as important steps that already
have taken place in television of which educators should take
note:[1]

I. Television has been used for mass testing purposes
and in the future it is believed standardized tests
can be given through this medium.

II. The research and projects developed by the Navy at
its Sands Point, Long Island center should be noted.

III. The medical profession is using television for in-
structing its members through the use of coaxial
cables connecting viewing screens to the operating
rooms.

IV. Magnification of objects through the use of the
microscope has been successfully used in television
broadcasts.

V. Aircraft with proper equipment have relayed tele-
vised pictures back to their home stations for film-
ing and making into topographical charts.

1. Ibid., pp. 158-9.

VI. By placing television cameras on remote mountain peaks and relaying pictures back to classrooms, astronomical study has been possible.

VII. Television kits for assemblying purposes come complete now with instructions so that their technical aspects of construction can easily be taught in the classroom.

VIII. Some public high school workshops already are set up training both teachers and students in television procedures. Graduates of the workshops are being employed immediately by the industry.

IX. Retentivity is very high in television programs, according to early experiments.

X. When necessary permission is received, still pictures or movies can be recorded from monitor scopes so that an up-to-date library can be maintained in such manner on pertinent subjects.

XI. A "community school," where school auditoriums are thrown open to the public for viewing special interest television programs bear public approval.

XII. Educational institutions should plan now on proper, reliable, inexpensive equipment with an eye to the future in television.

XIII. Educational institutions should consider setting up their own mobile television transmitting stations in trailers, for example, that allow for a multitude of locations thus giving added scope to the programs.

XIV. Television is not expected to replace the teacher, but will be a valuable assistant.

XV. Television is an entity all its own, but it will not replace present day radio. A merger will probably take place where FM (frequency modulation) will probably take the place of AM (amplitude modulation). FM will probably furnish the sound for television broadcasts and will carry on by itself as an audio medium during those hours when listeners cannot take time off to watch the screen.

XVI. Children are most effective on television when just being themselves.

XVII. Human beings, being natural imitators, accept as a challenge any new method they see of doing something, and television would provide the means for making this challenge possible.

XVIII. Television is so flexible a medium that it can go far beyond the possibilities of the stage and the movies.

Innovations that have taken place within the television industry are listed by Lewis as worthy of note to civilian educators:[1]

1. The United Nations Headquarters in New York have been planned to include television to link their principal offices so that officials may view screens to see as well as hear what is going on in the major council chambers.

1. Ibid., pp. 159-60.

2. Several large department stores in some
of our principal cities tested (very successfully)
a shopping service, whereby customers are seated
comfortably before a screen which reveals the hap-
penings in each of the departments as the television
camera makes the rounds.

3. Specially built equipment permits remote
observation of dangerous, inaccessible, and crit-
ical processes or experiments (inside oil wells,
steel mill processes, atomic explosions, etc.).
This device delivers a continuous image of a spe-
cific process to a screen located in an observation
room in a desirable place. Actually, a single per-
son can supervise many different situations by
means of a multiple screen installation.

4. During World War II, two general types of
airborne television were developed. Block equip-
ment was designed for unattended operation. "Ring"
apparatus requires the attention of an operator.
Both systems have potentialities which are far from
realization at this time. Imagine a helicopter
fitted with either type of television hovering
near the scene of a celebration, disaster, impor-
tant happening, process or operation, and report-
ing" to the viewing audience as the event occurs.
Robot or radio controlled craft can be so fitted
to assist in exploring the upper regions of the
"bottomless" holes in the sea.

5. Ultrafax, a new system of communication
which combines television and facsimile, may be
used for transmitting printed matter, maps, messages,
letters, drawings, and any other form of visual
material. The contents of a 500 page book can be
sent coast to coast in one half minute. The Sunday
metropolitan paper including the comics, can be
transmitted over the same route in just one min-
ute! A single television circuit can carry the
equivalent of 40 tons of airmail cross country in
a day. It is quite possible that some day Ultrafax
will replace the mails as we know it, since it's
just a further development of V-mail, but the im-
ages on the micro-film are transmitted and received
by television and re-recorded on other micro-film.

6. Underwater television experiments conducted
by the Navy opens a new field in deep water inves-
tigation and another in novel programs. Fishermen
may use this device to locate schools of fish and
oyster beds. Explorers will be enabled to scan the
ocean bottom, and even submarines may be fitted
with television "eyes."

7. Pleasure boats, commercial aircraft, and taxicabs have been equipped with the new medium as a service for their passengers.

8. It has been proposed that tourist agencies in vacation spots show their prospects the highlights of a proposed junket by means of images sent from an airplane flying over the area. This same method can be used for police traffic control of arterial highways in congested areas.

Some speculative experiments still in the laboratory stages should be reviewed also for the stimulus they may provide at some possible future date:[1]

I.   International television is a definite possibility now.

II. Electronic color television has been demonstrated and it is predicted it will be in commercial usage within the next few years.

III. Three dimensional images have been demonstrated and, although the equipment is too cumbersome at present the possibility exists of a third dimension being added to television pictures of the future.

IV. Infra-red image tubes have been demonstrated successfully. In the future, television pictures may be taken without the benefit of artificial light for illumination purposes.

It behooves all affiliated with training and educational processes to give television the utmost consideration.

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1. Ibid., p. 160.

Finstad has said:[1]

> The future holds even brighter prospects for
> the forward-looking. Visualize overcoming techni-
> cal difficulties and costs to the extent that teach-
> ing demonstrations could be transmitted to and
> relayed to ships wherever they might be; fancy
> personalizing the demonstrations through talk-back
> loops permitting coordinated questions and answers
> on the spot; imagine scrambling and unscrambling
> the transmissions to assure security of classified
> information! Truly, it is difficult to remain
> reservedly philosophical about the prospects of
> this medium.

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1. Allen Finstad, "The Navy Looks Forward in Audio-Visual
    Education," U.S. Naval Training Bulletin, November
    1948, pp. 22-3.

CHAPTER VII

RECOMMENDATIONS

The subject material of this study has been of such
a broad nature that it, as a whole, has been treated and
compiled as a summary of research in its subject field.
Chapter sub-divisions have been so compiled as to treat
their specific areas in summary form.

The recommendations suggested below are presented as
being applicable to the United States Navy so that its high
standards of training are consistently maintained in the
present and in the future as concerns training through the
medium of motion pictures. It is felt the Navy should:

I.   Continue always, during peacetime, the present
     Instructor Training Schools at Norfolk, Virginia
     and San Diego, California in order to build a
     nucleus of well-informed instructors, familiar with
     Navy methods, for a framework upon which to build
     a rapid expansion of trained instructors during
     emergency periods.

II. Place adequate emphasis on the curricula of the
     afore-mentioned schools on the proper utilization
     of audio-visual aids, but especially on the educa-
     tional and psychological principles involved in
     movie and television aids.

III. Arrange the curricula in the afore-mentioned schools
to allow training in the field of instruction
through television when present research of the
Special Devices Center and other institutions give
the proper criteria upon which to base such a cur-
riculum.

IV. Give adequate in-service publicity to the advan-
tages of motion pictures in a training program,
through the devices of the movies and television,
as learned by Pennsylvania State College and the
Special Devices Center.

V. Implement, as practicable, those theoretical prin-
ciples of movies learned at Pennsylvania State
College to the television research, problems, and
programs of the Special Devices Center.

VI. Make procedures of maximum cooperation feasible,
as concerns facilities and programming, between
the Navy's Photographic Center at Anacostia and
the television studios of the Special Devices Center,
in order that the two establishments may realize
full utility of each other's resources toward the
end of greatest utility and economy.

VII. Inform, through and with the cooperation of the
National Military Establishment, the Federal Com-
munications Commission regarding the network of
coaxial cables (which will give security to

classified instruction) that will be necessary for
the Navy's use in wartime training. It must be
borne in mind that the civilian populace itself will
probably have a great need for television coaxial
cables for instruction and morale purposes during
such periods.

VIII. Install television receivers for training and other
purposes in both shore stations and ships as soon
as technical difficulties have been surmounted.

IX. Cooperate with civilian educational institutions
toward the further development of motion pictures,
both through movies and television.

X. Consider the establishment of mobile television
transmitting units, complete in equipment and per-
sonnel, that could move from place to place giving
a maximum utilization of the far flung television
subject material of the Navy. One such unit, even,
in peacetime, for experimental purposes, should
be highly successful for public-information purposes,
such as "home-town-news" and recruiting.

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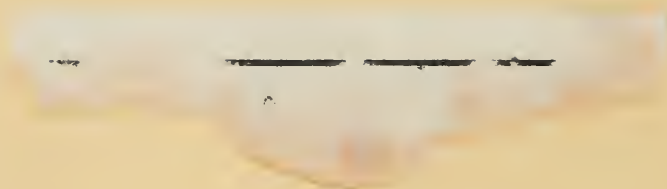
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